Overview
Freescale’s i.MX family of applications processors—the i.MX21, i.MX1, i.MXL and the DragonBall™ series of processors—provides Smart Speed technology and design-essential benefits for the next generation of mobile multimedia handhelds and wireless products. The low power consumption of Freescale’s applications processors enables wireless device users to benefit from extended run times as a result of advanced power management architecture.

i.MX21 Applications Processor
The newest member of Freescale’s widely adopted applications processor portfolio is the i.MX21 multimedia applications processor. Designed to deliver the ultimate performance in multimedia to handheld devices, the i.MX21 will enable developers to enter new dimensions in smart video, 3-D graphics, connectivity and power management.

Enhanced Video Capabilities
The i.MX21 is the first applications processor with a built-in, low-power eMMA hardware block, which consists of an MPEG-4 and H.263 encoder/decoder and image pre-processing and post-processing stages. These features provide exceptional image and video quality. Devices with the i.MX21 are capable of long video playback time with exceptional video quality (high frame rates and large-screen resolution support). Hardware code addresses the I/O bottleneck and helps reduce power consumption, enabling greater device mobility.

Exceptional Graphics
You can offer users a great experience watching video and running graphics-intensive applications such as 3-D gaming. The i.MX21 elevates overall system performance through a bus master interface that reduces the overhead to external multimedia coprocessors. Advanced graphics software standard APIs as well as 3-D software engines are also supported.

Power Management
All the robust features in the world don’t do you much good if your device can’t go the distance. The i.MX21 enables power-aware and power-optimized multimedia applications through effective system clock distribution, low current leakage control and frequency change on the fly.

Smart Speed Switch
Our Smart Speed switch allows you to achieve true parallelism resulting in more effective data per CPU cycle. The switch allows up to four simultaneous transactions, which can provide the effective throughput of a 532 MHz bus. This allows enriched multimedia experiences, such as V2IP, with exceptional quality that exceeds the performance of higher MHz processors.

Making Smartphones Even Smarter
The increase in mobile workers has created a growing market for mobile phones with PDA functionality that allows the user to have easy access to contact information, calendars, to-do lists, e-mail and the Internet. The new generation of mobile phones offers advanced personal information management (PIM), cameras, multimedia capabilities such as video capture and playback, and music players—features that really put the “smart” in phones!

One such technology, developed by Scanbuy, Inc., is Optical Intelligence, a proprietary technology that enables camera phones or other handheld devices equipped with digital cameras to transform into personal and wireless barcode scanners. With Optical Intelligence, a consumer need only photograph or point at a barcode to immediately access a multitude of content related to the captured barcode. Optical Intelligence opens a wide array of new applications for consumers and businesses and supports all standard one-dimensional and two-dimensional barcodes.

Learn More: For more information about Freescale products, please visit www.freescale.com.
At the heart of Optical Intelligence technology is the decoding engine. The decoding engine provides the ability to translate barcodes from the captured image data as seen through the mobile device’s camera. The engine is able to overcome many challenges such as adverse lighting conditions, variations in size of printed/displayed barcodes, geometric distortions brought about by skewed angles, restricted battery power, and several image formats. In addition, the Optical Intelligence decoding engine is able to read and translate barcodes on printed material, electronic displays and in varying degrees of rotation. It is also able to automatically detect the barcode protocol being scanned.

Optical Intelligence Technology Overview

Optical Intelligence technology has been designed from inception to perform reliably in difficult decoding situations. The current decoding software modules are successful in variable light, low contrast, low resolution, focus and other impaired conditions. Optical Intelligence uses several specific techniques that are key to a high decoding success rate for both public standard and proprietary barcodes. Key technical decoding features include:

- Enabling identification and decoding of most barcodes at any degree of rotation from the normal orientation.
- Managing tolerance of “aspect ratio,” “shear,” “perspective,” and their geometric image distortions.
- Performing an adaptive, “multiple hypotheses” approach to detect the presence of a feature.
- Running sophisticated error correction technology based on the “Reed-Solomon” algorithm.
- Decoding barcode images with limited resolution: typically with a VGA (640x480) imager.

Optical barcode capture sidesteps two of the most challenging obstacles to the development of m-commerce: tedious data entry and poor Web navigation. By pointing at a barcode—that can be found on virtually all retail products and potentially on advertising—consumers immediately access multiple sets of information related to the item they are interested in. Consumers can compare price, place orders, download ringtones, access dietary information, and perform a variety of other tasks using barcode capture. Field technicians or sales reps will also benefit from this technology by being able to access their back-office systems to manage inventory, access equipment information or place orders.

Partnering with Freescale

Optical Intelligence technology can be used by developers to integrate barcode reading capability into their consumer and enterprise applications. Freescale’s i.MX21 applications processor offers developers the benefits of features like Smart Speed technology, low power consumption and extended battery life. By interfacing with the Optical Intelligence libraries on a mobile device, developers can immediately include this technology within their own applications and take advantage of the i.MX21’s features. This straightforward and simple method eliminates research and development time and offers customers a reliable, common and familiar user experience.

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